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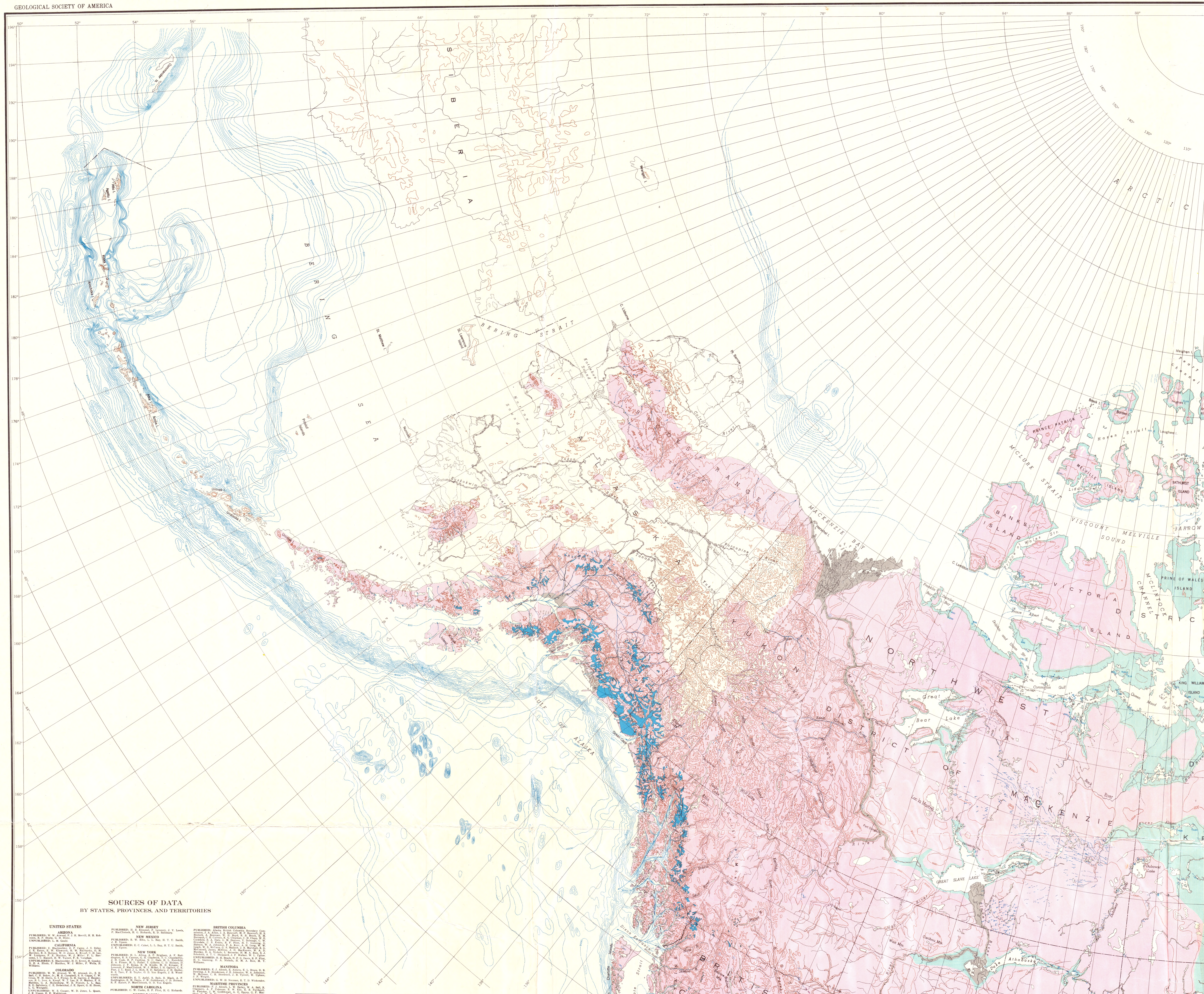

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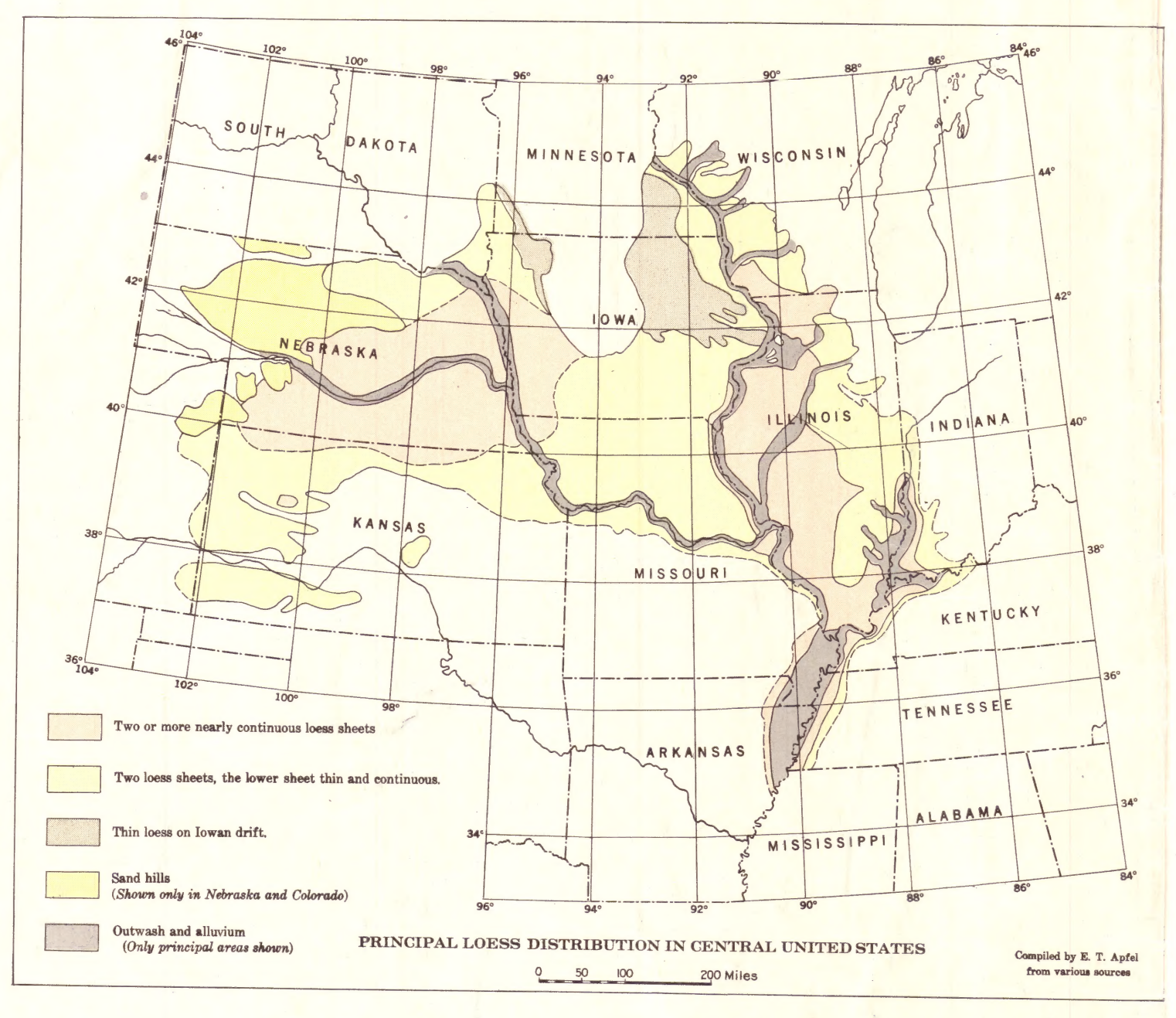
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ARKANSAS
ALABAMA
MISSISSIPPI
Two or more nearly continuous loess sheets
Two loess sheets, the lower sheet thin and continuous.
Thin loess on Iowan drift.
Sand hills
(Shown only in Nebraska and Colorado)
Outwash and alluvium
(Only principal areas shown)
0 50 100 200 Miles

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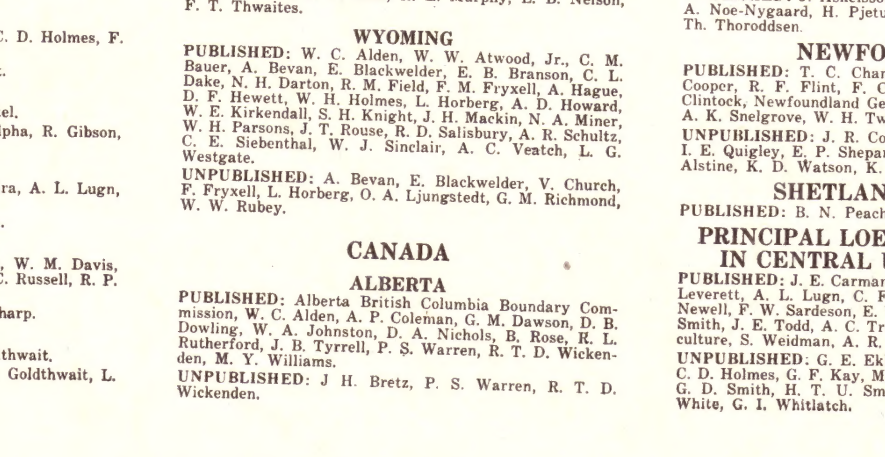

Glacial Map of the
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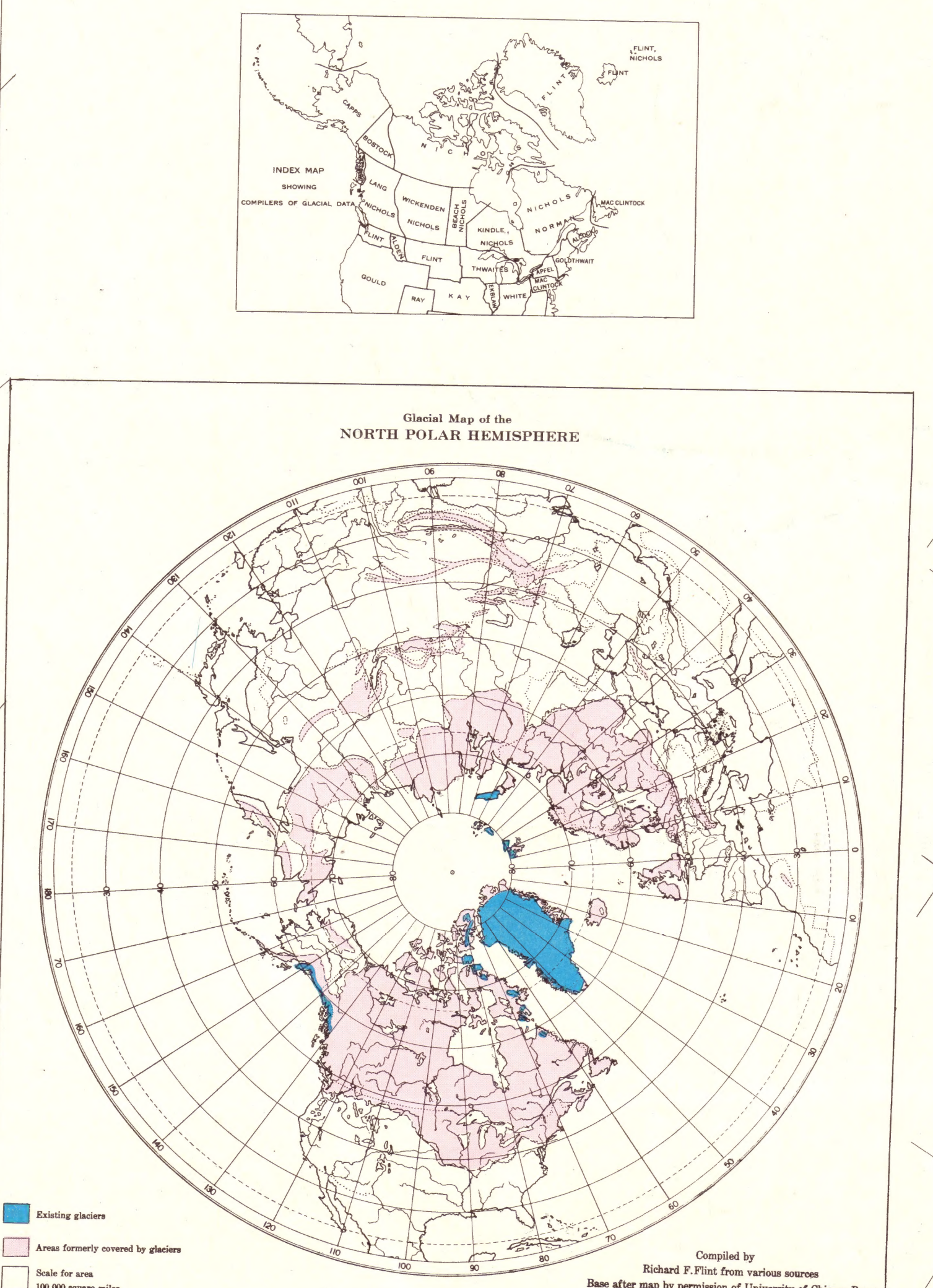

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Lambert's azimuthal, equal area projection.

LEGEND

AREAL COLORS

Note: Contacts and boundaries are shown, in order of decreasing reliability, by continuous lines, broken lines, dotted lines, and absence of lines. End (terminal) moraines are shown in dark tones; glaciated areas other than end moraines in light tones.

- 🟦 Existing glaciers
- ▥ Areas of marine submergence *(Normally postdating the drift in the locality)*
- ▨ Areas of marine submergence *(Interglacial and interstadial)*
- ▤ Extinct glacial and other Pleistocene lakes *(Represented by deposits of significant area and thickness; outlets, where determined, indicated by inclosed arrow)*
- ⬜ Outwash *(Includes some inwash, consisting in part of nonglacial sediments washed against glacier ice or outwash. Also includes some areas eroded by meltwater streams, and some alluvium. Small outwash bodies in region of Wisconsin glaciation not mapped)*
- 🟪 Wisconsin glaciation: Undifferentiated *(Includes Olean and Binghamton drifts in New York and Pennsylvania. May include pre-Wisconsin glaciation in Arctic region. Areas of doubtful glaciation shown by question mark.)*
- 🟪 Wisconsin glaciation: Mankato substage *(Includes Port Huron and Valders drifts.)*
- 🟧 Wisconsin glaciation: Cary substage
- 🟫 Wisconsin glaciation: Tazewell substage
- 🟨 Wisconsin glaciation: Iowan substage *(Includes variously interpreted pre-Mankato drifts in North Dakota and South Dakota, and drift in Montana that may be Illinoian.)*
- 🟫 Pre-Wisconsin glaciation: Undifferentiated
- 🟩 Illinoian glaciation and probable correlatives
- 🟨 Kansan glaciation and probable correlatives *(Includes Jerseyan drift in New Jersey and Pennsylvania.)*
- ▥ Nebraskan glaciation and probable correlatives

SYMBOLS

- Striae *(Center of shaft marks location)*
- Two sets of crossing striae *(The earlier set, where determined, is shown by a broken shaft)*
- 10 9 8 Striae in three or more directions at a single locality *(Figures represent numbers of striae recorded, by directions)*
- Groups of drumlins *(Long axes shown by arrows)*
- Linear boulder trains
- Fan-shaped boulder trains
- Direction of glacier flow through mountain valleys
- Eskers *(Drawn to scale; small eskers not shown)*
- + Isolated erratics beyond the drift sheets *(Each symbol denotes a locality in which one or more erratics occur)*
- ▲ Occurrence of fossil-bearing interglacial and interstadial deposits
- Occurrence of glacial-marine sediments *(Where not mappable as a body)*
- Occurrence of varved sediments *(Where not mappable as a body)*
- Outlets of extinct glacial lakes
- 265 Altitudes (in feet) of highest observed marine features
- ×---×----×·····× Contact (approximate) between ice-sheet drift and Rocky Mountains drift in Alberta
- ③ Footnote reference to special features *(Listed by States, Provinces and Territories, in inset)*

FORM LINES ON THE LAND (BROWN)
Eastern and central region: at 500, 1000, 2000, 4000, 6000 feet altitude.
Cordilleran region: at 2000, 4000, 8000, 12000 feet altitude.
FORM LINES ON THE SEA FLOOR (BLUE):
at 500, 1000, and every thousand feet below sea level.

FOOTNOTES

UNITED STATES

CALIFORNIA

(1) Pre-Wisconsin glaciation in the San Gabriel Mountains (Miller, 1926). Glaciers flowed from altitudes of 8000 ft. down to 3000 ft. Evidence of glaciation seriously questioned by later investigators.
(2) Occurrences of McGee stage (Nebraskan?) of Blackwelder (1931) consisting of "isolated bodies of boulder earth."
(3) Occurrences of Sherwin stage (Kansan?) of Blackwelder (1931) consisting of "large bodies of unmistakable till." Igneous rocks in this drift are much weathered; only the siliceous rocks retain striae.
(4) Occurrences of glacier-borne boulders, occurring singly or in groups, which are residuals of moraines. Glacier Point stage of Matthes (1930B). Referred by Matthes to the Kansan or Nebraskan; by Blackwelder (1931) to the Sherwin (Kansan?).

COLORADO

(1) Prairie Divide (pre-Wisconsin) stage of glaciation from Cache la Poudre Basin (Bryan and Ray). Remnants of an old widespread till are preserved on flats above present drainage.
(2), (3), (4)
Older (pre-Wisconsin) till probably equivalent to Prairie Divide and Cerro tills.
(5), (6)
Type localities of Cerro till (Atwood and Mather, 1932) on interstream divides around margins of San Juan Mountains. Boulders deeply weathered; morainic topography destroyed by erosion.

CONNECTICUT

(1) Tough weathered varved silt and clay overlain by Wisconsin till (Flint, 1933).

IDAHO

(1) Great extension of Buffalo till along the northwestern side of the Teton Range. Comparable drift seems to cover most of the plateau of Yellowstone Park. (E. Blackwelder, **unpublished**).
(2) Deeply weathered high-level drift in central Idaho referred by Ross (1929) to the Nebraskan or Kansan stage.
(3) Throughout central Idaho local (valley) glaciation occurred generally above 7000 ft., and in places extended down to 4000 ft. Glaciation probably more extensive than here shown.

ILLINOIS

(1) Undifferentiated soil and Wisconsin silt, 3 ft.; Marseilles outwash gravel, 6 in.; Bloomington pink calcareous till with lenses of sand and gravel, 15-17 ft.; Shelbyville silt, gravel, and sand, 6 ft.; Sangamon peat, 4 ft.; Illinoian till, leached, 3-5 ft.; Illinoian till, calcareous, 0-2 ft. (Willman and Payne, 1942).
(2) Undifferentiated soil and Wisconsin silt, 3 ft.; Fox River Torrent (Marseilles) gravel, 0-2 ft.; Farm Ridge light gray till, 9-10 ft.; Lake Illinois (Bloomington) sand and silt, 3-9 ft.; Bloomington till with sand and gravel, 20-28 ft.; Lake Kickapoo (Shelbyville) laminated calcareous clay, 0-17 ft.; Sangamon muck, clay, peat, and silt, 0-5 ft.; Illinoian till, leached, 0-2 ft.; Illinoian till, calcareous, 0-8 ft.; Kansan till, leached, 0-3 ft.; pre-Kansan sand and silt, leached, 0-10 ft. (Willman and Payne, 1942; Sauer, 1916, p. 77).
(3) Undifferentiated Wisconsin outwash gravel, 5-15 ft.; Bloomington pink till, 15-40 ft.; Lake Kickapoo (Shelbyville) gravel and sand, 30-40 ft.; Sangamon loess and peat, 2-10 ft.; Illinoian drift, weathered at top, 25-30 ft.; Yarmouth loess and silt, 20-30 ft.; Kansan (?) till (Cady, 1919, p. 71-77; Sauer, 1916, p. 72-73, 94-95). Numerous outcrops along bluffs and tributaries on both sides of Illinois Valley, especially in the vicinity of De Pue.
(4) Wisconsin (Tazewell and Cary) loess, Wisconsin (Tazewell) till, Iowan loess, Sangamon loess and peat, Illinoian till, in numerous outcrops (Cady, 1919, p. 76-77, pl. 5).
(5) Soil and Peorian loess, 7 ft.; Sangamon soil, 8 in.; Illinoian gumbotil, 3 ft.; Illinoian till, leached, 6 ft.; Kansan gumbotil, 1 ft. 6 in.; Kansan till, leached, 3 ft. (Wanless, 1929, p. 93-96, geol. sec. 22).
(6) Post-Bloomington soil, 1 ft.-1 ft. 6 in.; Tazewell leached loess, 3 ft. 6 in.; Tazewell calcareous loess, 0 ft.-2 ft. 6 in.; Bloomington outwash gravel, 0-4 ft.; Shelbyville till, 32 ft.; Iowan loess, 6 ft.; Late Sangamon loess, 8-10 ft.; Illinoian gumbotil, 4 ft.; Illinoian calcareous till, 41 ft. (Leighton, 1925, p. 401-403; MacClintock, 1926, p. 168-169, p. 4-5; Leighton and Ekblaw, 1932, p. 19; Leverett, 1899, p. 128 and pl. 11; see also Leverett, 1899, p. 32, and pl. 11-B for similar occurrence).
(7) Tazewell loess, Tazewell (= Bloomington, Leroy, and Shelbyville) till, Iowan loess, Sangamon peat and bog subsoil, Illinoian gumbotil, Illinoian till, totaling altogether 150 ft. (G. E. Ekblaw, **unpublished**).
(8) Peorian loess, Late Sangamon loess, Illinoian till, Yarmouth fossiliferous loess, Yarmouth (?) noncalcareous silt (G. E. Ekblaw, **unpublished**).
(9) Illinoian till, 30 ft.; Yarmouth silt, 17 ft.; Kansan leached till, 5 ft.; Kansan calcareous till, 5 ft.; Aftonian (?) calcareous fossiliferous silt, 3-4 ft. (T. B. Root, **unpublished**).
(10) Illinoian leached till, 5 ft.; Illinoian calcareous till, oxidized, 10 ft.; unaltered, 12 ft.; Kansan calcareous till, oxidized, 5-7 ft., unaltered, 4-6 ft.; Nebraskan gumbotil, 4 ft. (Bell and Leighton, 1929, p. 485-486).
(11) Tazewell loess, 3-4 ft.; Shelbyville till, 0-20 ft.; Iowan loess, 2 ft.; Sangamon black soil, ± 1 ft.; Illinoian gumbotil, 2-3 ft.; Illinoian till (Leighton and Ekblaw, 1934, p. 111).
(12) Shelbyville till, 20 ft.; Iowan loess, 2 ft.; Sangamon peat and soil, 2 ft.; Illinoian till, 3 ft. (Savage, 1931, p. 447).
(13) Peorian loess and silt, 4-10 ft.; Sangamon soil, 3 ft.; Illinoian leached till, 4 ft.; Illinoian calcareous till, 18 ft.; Kansan gumbotil, 3 ft.; Kansan leached till, 6 in.-3 ft.; Kansan calcareous till, 10-20 ft. (MacClintock, 1929, pp. 34, 35, 40, locs. 4, 5, 11).
(14) Illinoian till, 20 ft.; Yarmouth humus and fossiliferous silt; Kansan till, 7 ft. (Ball, 1937, p. 222).
(15) Tazewell till, Iowan loess, Late Sangamon loess, and Illinoian gumbotil grading down to Illinoian calcareous till (Leighton, **unpublished**).
(16) Peorian and Sangamon loess, 3-5 ft.; Illinoian gumbotil, 2 ft.; Illinoian leached till, 13 ft.; Illinoian calcareous till, 3 ft.; Yarmouth loess, 12-15 ft.; Kansan gumbotil, 3 ft.; Kansan leached till, 6-8 ft.; Kansan calcareous till, 5 ft. 6 in. (MacClintock, 1926, p. 176-177, p. 11-12; 1929, p. 55, loc. 34).

INDIANA

(1) Numerous occurrences of interglacial deposits referred to the Sangamon age. (Thornbury, 1937, p. 100-121).

IOWA

(1) Loveland volcanic ash, 2-3 ft. thick. Stratigraphic position; basal- to middle-loess phase of Loveland formation.
(2) Aftonian silt and peat, 8 ft. 6 in. thick. Stratigraphic position: post-Nebraskan-till, pre-Kansan-till. Pollen analysis by Lane (1941, p. 243).
(3) Aftonian silt and peat, 4 ft. 6 in. thick. Stratigraphic position: post-Nebraskan-till, pre-Kansan-till. Pollen analysis by Lane (1941, p. 243).
(4) Aftonian silt and peat, 10 ft. thick. Stratigraphic position: post-Nebraskan-till, pre-Kansan-till. Pollen analysis by Lane (1941, p. 252).
(5) Aftonian silt and peat, 8 ft. 6 in. thick. Stratigraphic position: post-Nebraskan-till, pre-Kansan-till. Pollen analysis by Lane (1941, p. 250).
(6) Sangamon soil. Stratigraphic position: post-Illinoian-gumbotil, pre-Peorian-loess.
(7) Aftonian silt and peat, ± 8 ft. thick. Stratigraphic position: post-Nebraskan-till, pre-Kansan-till.
(8) Sangamon peat, 1 ft. 6 in.-2 ft. thick. Stratigraphic position: post-Illinoian-gumbotil, pre-Peorian-loess. Pollen analysis by Lane (1941, p. 256).
(9) Sangamon peat. Stratigraphic position: post-Illinoian-gumbotil, pre-Peorian-loess. A neighboring section of the peat reported to have contained elephant bones (Udden, 1898, p. 350).
(10) Sangamon peat, 3 ft. thick. Stratigraphic position: post-Illinoian-till, pre-Peorian-loess. Vegetation analysis by C. H. Peck (Pratt, 1876, p. 96).
(11) Lake Calvin, formed by damming of Mississippi, Iowa, and Cedar rivers by Illinoian glacier ice Drained in late-Sangamon time (?) (Schoewe, 1919-1920, p. 211).
(12) Sangamon soil. Stratigraphic position: post-Loveland-loess, pre-Iowan-till.
(13) Aftonian peat, 4 ft. thick. Stratigraphic position: post-Nebraskan-till, pre-Kansan-till. This is the Oelwein section, which first demonstrated three tills in the "Upper and Lower Till" area of McGee.
(14) Yarmouth soil Stratigraphic position: post-Kansan-gumbotil, pre-Loveland-gray-silts.
(15) Aftonian peat, 6 in. thick. Stratigraphic position: post-Nebraskan-till, pre-Kansan-till. Pollen analysis by Wilson and Kosanke (1940, p. 1).
(16) Lake Calvin overflow channel, mapped by Leverett (1899, p. 91) as a temporary Mississippi River channel.
(17) Aftonian peat, 2 ft. 6 in.-3 ft. thick. Stratigraphic position: post-Nebraskan-till, pre-Kansan-till.

KANSAS

(1) Kansan or Nebraskan outwash (McPherson formation, restricted; Lohman and Frye, 1940, p. 851). Sand and silt with interbedded gravel and clay. Thickness, up to 150 ft.
(2) Kaw Lake sands, Kansan or Nebraskan.
(3) Attenuated drift mapped as Kansan in conformity with an outlying area of drift to the north, which is in the topographic position of the Kansan.
(4) Isolated areas of till, reworked till, and boulders (Nebraskan?). Contrasts with well-defined Kansan drift farther north.

MASSACHUSETTS

(1), (2), (3), (4)
All or parts of a section consisting of:
e. Sandy till
d. Gravel and sand with lenses of till, silt, and clay (Jacob (?) and Mannetto (?))
c. Massive blue clay (Gardiners?)
b. Crossbedded sand (Jameco?)
a. Till (?) (Moshup?)
are exposed in cliffs at the following localities:
(1) On west shore of Cape Cod Bay: Manomet Point; Indian Hill.
(2) On Cape Cod: Nobscusset Point; South Wellfleet; Highland Light; Nauset.
(3) On Nantucket Island: Sankaty Head; Sachem Spring.
(4) On Martha's Vineyard Island and vicinity: Norton Point; Roaring Brook; Prospect Hill; Gay Head; Nashaquitsa Cliffs; Squibnocket Cliffs; No Man's Land Island; Nonamesset Island; Nashawena Island; Cuttyhunk Island.

MINNESOTA

(1) Peat resting on Nebraskan till and overlain by Kansan till (Leverett, 1932, p. 16).
(2) Nebraskan drift with patches of peat on top, overlain by younger drift, exposed in brick and tile clay pit in Springfield.
(3) Nebraskan drift with residual soil, overlain by Kansan drift with residual soil, in turn overlain by younger drift, exposed in deep road cut in Minnesota River valley near Mankato.

MISSOURI

(1) Attenuated (Nebraskan?) drift characterized by scattered erratics on the uplands.

MONTANA

(1), (2)
Early Pleistocene till on high ridges along Belly River. Till derived from the south; much limestone removed from upper 10-20 ft. Antedates 1000-1500 ft. of erosion by Belly River (Alden, 1932, p. 32 ff.).
(3) Early Pleistocene boulder- and cobble gravel, including striated stones, on benches higher than the probable upper limit of Wisconsin drift, east of Chief Mountain. Derived from the southwest.
(4), (5), (6)
Early Pleistocene till and tillite, 100-200 ft. thick, on high benches up to 1500 ft. above Lake Sherburne and Lower Saint Mary Lake, and along Cutbank Creek. Till derived from the west; upper part leached.
(7) Till and tillite 150 ft. thick, and upper 25-30 ft. leached, on a high bench north of Lower Two Medicine Lake. Early Pleistocene (perhaps more than one stage). (Alden, 1932, p. 39-40).
(8), (9)
Till (Iowan or Illinoian?) extending 20-25 miles south of undoubted Wisconsin drift, and partly mantled by deposits of Glacial Lake Missoula.
(10), (11)
Eroded drift (Iowan or Illinoian?) extending beyond massive end moraines of undoubted Wisconsin age.
(12) Bouldery drift and erosion features south of Maxville; decomposed high-level non-granitic drift near Pioneer deposited before Gold Creek headed back into granitic rocks.
(13) Decomposed high-level drift northwest of Deerlodge, antedating 1000 ft. of stream erosion prior to Wisconsin age. Eroded drift south of Philipsburg on Fred Burr Creek (Calkins and Emmons, 1915).
(14) Eroded morainic drift (Illinoian or Iowan?) outside the massive Wisconsin end moraines near Darby; deeply decomposed early Pleistocene (?) drift on high spurs.
(15) Eroded morainic drift outside the massive Wisconsin end moraines in Big Hole Basin southwest and northwest of Wisdom.
(16) Drift, in part decomposed, of probably more than one pre-Wisconsin age, outside the Wisconsin drift at several localities in and south of Pioneer Mountains.
(17) Much-eroded bouldery drift, perhaps early Pleistocene, near Grace and Silverbow. Possibly correlated with Cerro till in San Juan Mountains, Colorado (Atwood, 1938, p. 242-244).
(18) Massive morainic drift (Illinoian or Iowan?) outside the Wisconsin drift south of Madison River Canyon. High-level granitic boulders farther north in the same district may be remnants of early Pleistocene drift.
(19) Eroded drift (Iowan or Illinoian?) below West Yellowstone and on tributaries to Gallatin River. Boulders outside the mapped Wisconsin drift north of Bozeman may be pre-Wisconsin drift (Peale, 1896).
(20) Iowan or Illinoian (?) drift in Yellowstone Valley above Livingston, and on Boulder River south of Big Timber; also possible early Wisconsin drift at latter locality. Pre-Wisconsin (?) drift on spurs south of Livingston (Weed, 1893; Alden, 1932, p. 62; Horberg, 1940, p. 297). Illinoian or Iowan (?) lateral moraine southeast of Big Timber. High-level decomposed granitic boulders (early Pleistocene?) near Roscoe (Alden, 1932, p. 26, 125).
(21) High-level decomposed boulders outside the Wisconsin drift at south base of Castle Mountains (Weed, 1896, p. 144-145; 1899, p. 3, 7; Alden, 1932, p. 40-41). Eroded pre-Wisconsin moraine in Big Belt Mountains (Pardee, 1925, p. 37).

NEBRASKA

(1) Loveland volcanic ash, 5-20 ft. thick. Stratigraphic position; post-Kansan-Grand-Island-gravel (?), pre-upper-loess-phase of Loveland formation.
(2) Loveland volcanic ash, up to 50 ft. thick. Stratigraphic position: base of loess phase of Loveland formation.
(3) Aftonian (?) peat, 10 ft. thick. Stratigraphic position: top of Aftonian Fullerton formation; post-Nebraskan-Holdrege-gravel, pre-Kansan-Grand-Island-gravel.
(4) Loveland volcanic ash, 8-9 ft. thick. Stratigraphic position: post-Kansan (?) till, pre-upper-loess phase of Loveland formation.
(5) Todd Valley formation. Silt, sand and gravel, up to 190 ft. thick. Stratigraphic position: post-Loveland-loess, pre-Peorian-loess.
(6) Western limit of outwash, based on lithology and size sorting (A. L. Lugn, **unpublished**). Facies west of this limit consists of reworked Tertiary material and gravel derived from the west.

NEW MEXICO

(1) Thick till on higher parts of the Canjillon Divide, believed by Smith (1936) to represent maximum extent of Cerro glaciation of the San Juan Mountains of Colorado.
(2) Small area of mountain glaciation on Cerro Blanco (alt. 12,003 ft.) at lat. 33°23′N., Long. 105°49′W., just south of base of this map. This is the southernmost record of glaciation in the United States reported thus far.

NEW YORK

(1) **Exposure at Otto: (a) Weathered drift, (b) Peat, (c) Olean drift, (d) Lake sediments, (e) Binghamton drift (P. MacClintock, unpublished).**
(2) Buried gorge, now partly re-excavated, probably interglacial. Tributary to a valley possibly of still earlier interglacial date (Holmes, 1935).
(3) Interglacial or interstadial stream gravel in interglacial gorge, preserved under little-weathered drift (Von Engeln, 1929).
(4) Buried interglacial valley of Hudson river between Corinth and Fort Edward, revealed by borings and by topography (Stoller, 1930).
(5) Gardiners clay (with marine fossils) and Jacob sand, both probably interglacial (Fuller, 1914).
(6) Several localities in Long Island district expose Gardiners clay, carrying marine fossils and lying between 2 tills (Fuller, 1914).
(7) Jones Beach. Cape May formation, with marine fossils, overlain by Ronkonkoma outwash (MacClintock, and Richards, 1936).
(8) Cirques and moraines recording mountain glaciation in Adirondack Mountains after disappearance of ice sheet (Johnson, 1917).
(9) Local glaciers existed in Catskill Mountains after withdrawal of continental ice (Johnson, 1917; Rich, 1935).

NORTH DAKOTA

(1) Section exposing two tills, Iowan (?) on Kansan (?) (Alpha, 1935, p. 17).

OHIO

(1) Interglacial peat horizon of Sangamon date (Orton, 1870, p. 54).
(2) Interglacial horizon consisting of peat and other organic material. Stratigraphic position = Sangamon (Leverett, 1893, p. 138).
(3) Interglacial horizon consisting of peat and buried soil (Wolford, 1942, **unpublished**). Stratigraphic position = Sangamon (J. J. Wolford, **unpublished**).

RHODE ISLAND

(1) At Clay Head and Mohegan Bluffs on Block Island is exposed a section consisting of:
e. Sandy till
d. Gravel and sand with lenses of till, silt, and clay (Jacob (?) and Mannetto (?))
c. Massive blue clay (Gardiners?)
b. Crossbedded sand (Jameco?)
a. Till (?) (Moshup?)

SOUTH DAKOTA

(1) Lacustrine silt, with fossil fishes, intercalated between two tills. (M. E. Kirby, **unpublished**).

WASHINGTON

(1) Pre-Vashon drift (= Admiralty drift of Willis?) extending locally 7 miles beyond Vashon drift border. Depth of oxidation 7 to 10 ft. Stones have weathered rind ⅛ to ¼ inch thick. A still older drift may be present in this district (J. H. Mackin, **unpublished**).
(2) Drifts exposed in the Mt. Stuart quadrangle (Page, 1939):
c. Stuart drift (fresh; locally indistinguishable from Leavenworth drift)
b. Leavenworth drift (fresh to moderately decomposed)
a. Peshastin drift (deeply decomposed)
(3) Drifts exposed in Entiat Valley (R. F. Flint, **unpublished**):
b. Fresh drift (= late Wisconsin?)
a. Moderately decomposed drift (= Leavenworth drift at (2) ?)
(4) Outwash (?) gravel, including foreign stones, moderately decomposed, exposed south of Connell (Flint, 1938, p. 518).
(5) Drift, conspicuously decomposed, antedating the last glaciation, exposed along Klickitat River near boundary of Yakima Indian Reservation (R. F. Flint, **unpublished**).
(6) Type locality of Puyallup interglacial beds (Willis, 1898, p. 145). Sand, gravel, clay (in part marine) and peat. Stratigraphic position = post-Admiralty, pre-Vashon (Wisconsin?). Time interval and climate based on degree of oxidation.
(7) Beacon Hill peat (Hansen and Mackin, 1940) referred to Puyallup interglacial stage. Stratigraphic position = post-Admiralty, pre-Vashon (Wisconsin?). Time interval at least several thousand years. Climate (based on grass and coniferous trees) less mild than present climate.
(8) Local valley glaciation, not mapped, in Olympic Mountains.

WISCONSIN

(1), (2), (3)
Silty peat, overlying Cary drift and overlain by Mankato (?) till, and including *Picea*, mosses, and aquatic mollusks. A climate colder than the present climate is suggested (Wilson, 1932; Lawson, 1902).
(4) Pollen-bearing peat overlying sandy clay and overlain by Iowan (?) till.
(5) Peat with wood, resting on Nebraskan till and overlain by Kansan till (Leverett, 1932, p. 16).

WYOMING

(1) Boulder gravel older than the two late stages of the Pleistocene, widespread around the Big Horn Mountains. In places this gravel has till characteristics and is referred to a much older stage of glaciation than the Wisconsin (Blackwelder and Salisbury, 1903).
(2) Unnamed pre-Wisconsin drift described from the Beartooth Mountains northeast of Yellowstone Park (Bevan, 1923).
(3) Type locality of Buffalo till (Kansan?) occurring as remnants on flat-topped divides, hills, and spurs (Blackwelder, 1915).
(4) A locality of widespread Buffalo till (See note (3)).
(5) Little Dry glacial stage (= Buffalo? = Kansan?), represented by massive terminal moraines preserved along the north flank of the Uinta Mountains (Bradley, 1936).

CANADA

ALBERTA

(1) Interglacial finely stratified silt, loess, and lignitic material on Belly River. (Alden, 1932. Silt between two till sheets on Bow River. (Dawson, 1896.)
(2) Interglacial (?) gravel. (Alden, 1932).
(3) Fossiliferous sands and gravels between two tills. (Wickenden, **unpublished**).
(4) Cypress Hills lack evidence of glaciation above altitude 4400 ft. (McConnell, 1885).
(5) Existing glaciers too small for representation to scale.

BRITISH COLUMBIA

(1) Interglacial clay, sand, gravel and peat separating Admiralty and Vashon tills (Johnston, 1923; Clapp, 1913, 1917).
(2) "White Silts" occur in major valleys throughout the Interior Plateau of British Columbia and in Peace River Valley (Dawson, 1890).
(3) Existing glaciers too small for representation to scale.
(4) Rich gold-bearing alluvium overlain and underlain by till (Johnston, 1926).

MANITOBA

(1) Interglacial fossiliferous stratified sand and clay, 70 feet thick, overlain by till. (Tyrrell, 1893).

MARITIME PROVINCES

(1) Three different superimposed tills. Three distinct ages of glaciation or three advances of ice from different directions is suggested (Wickenden, 1941).

NORTHWEST TERRITORIES

(1) Till throughout the greater part of Mackenzie River Valley is overlain by thick stratified sand, gravel and clay, and is underlain by lacustrine (?) gravel, 0-150 ft. thick, containing boulders of Pre-Cambrian rocks (McConnell, 1888-1889).
(2) Existing glaciers too small for representation to scale.

ONTARIO

(1) Interglacial clay and lignite overlain by till (Williams, 1920).
(2) Interglacial thin-bedded sand, clay, carbonaceous silt, and peat, 7 to 12 ft. thick, with *Picea*, *Pinus*, and *Betula* pollen and *Sphagnum* and *Hypnum* mosses (McLearn, 1926; Dyer, 1928).
(3) Don interglacial peaty clays and sands, 45 feet thick, containing fauna and flora indicative of warmer climate than the present, overlain by Scarboro interglacial peaty clays and sands, 150 feet thick, indicative of cooler climate than the present. (Coleman, 1913).

QUEBEC AND LABRADOR

(1) Interglacial (?) stratified sand and clay intercalated between two tills (Stansfield, 1915).
(2) Small parallel ridges of sand, clay, gravel, and boulders, not yet fully mapped (Norman, 1938; G. Shaw, **unpublished**).
(3) Existing glaciers too small for representation to scale.

SASKATCHEWAN

(1) Lignite 1 ft. thick at or near top of till section (Johnston and Wickenden, 1931).
(2) Three tills separated by fossiliferous sands, gravels, and old soils (Wickenden, 1931).
(3) Two thin tills separated by fossiliferous sand and gravel (Wickenden, 1931).
(4) Two tills separated by fossiliferous sand and gravel (Wickenden, **unpublished**).
(5) Interlobate area of little or no drift (Wickenden, 1931).
(6) Summit of Cypress Hills lacks evidence of glaciation (McConnell, 1885).
(7) Small, roughly parallel ridges of sand, interpreted as crevasse fillings (Sproule, 1939).

YUKON

(1) Pre-Late Wisconsin till in placer workings beyond the limit of Late Wisconsin glaciation (Bostock, 1936).
(2) Existing glaciers too small for representation to scale.

ALASKA

(1) Beds, partly glacial and partly marine, with Pleistocene fossils, 2000 to 5000 ft. thick, now elevated to as much as 5000 ft. above sea level.
(2) Interbedded gravel, till and tillite, more than 3000 ft. thick, steeply inclined and overlain by Wisconsin drift.
(3) Boulder gravel and scattered boulders on ridges that stand at least 2600 ft. above well-defined moraines of Wisconsin age.
(4) Deeply decomposed till lying beneath fresh till of Wisconsin age.
(5) Much or all of the Arctic coastal plain carries marine deposits, probably interglacial, with invertebrate fossils, up to as much as 300 ft. above sea level (Smith and Mertie, 1930, p. 238).
(6) The higher parts of the Aleutian Islands were glaciated, but glaciation is not mapped west of Long. 165°.

BERMUDA

(1) The Pleistocene stratigraphy of Bermuda consists largely of calcareous eolianites accumulated during the low sea levels of the glacial ages, interbedded with residual soils developed during the high sea levels of the interglacial ages (Sayles, 1931).

ICELAND

(1) Till, overlying basalt, overlying fluvial deposits 230 ft. thick containing fossil plants that record a climate warmer than now, overlying a glaciated valley floor (Lindal, 1939).
(2) Till, overlying marine sediments, overlying glaciated bedrock (Askelsson, 1938).
(3) Terminus of Breidamerjokull, an existing outlet glacier, rests on marine sediments 150-200 ft. above sea level (Pjeturss, 1907).

NEWFOUNDLAND

(1) Much-weathered dark-red drift underlying fresh Wisconsin drift at Maine Brook, 15 miles N. of St. Lawrence (R. E. Van Alstine, **unpublished**).

SHETLAND ISLANDS

(1) Glaciation by Scandinavian ice sheet followed by local glaciation (Peach and Horne, 1879, p. 790).

MAPS
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GLACIAL MAP OF NORTH AMERICA

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Approximately 1 inch to 72 miles
Lambert conformal conic projection

0 50 100 150 200 250 300 350 400 450 500 Miles

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